OISD CARRIED OUT SAFETY AUDIT FOR MAJOR PORTS FOR THE FIRST TIME
Esteemed Readers,

In the last quarter, audit of twelve major ports was carried out by OISD on a special request from Ministry of Shipping to conduct independent audit of the existing oil spill response capability to assess the adequacy or otherwise of the facilities available to handle Tier-I oil spills. While assessing the oil spill response facility (Tier-I), OISD also included assessment of the fire fighting system of these ports. I am happy to say that the special audit was successfully carried out by OISD experts and a consolidated detailed technical report was submitted to the Ministry of Shipping.

A Study Tour was carried out during September 23-25, 2015 at Lisbon, Portugal for ascertaining the feasibility of pumping LPG in multi-product Pipeline of HPCL. The delegation was led by JS (R), along with members from OISD, PESO, EIL and HPCL.


Pre-commissioning Safety Audit of the prestigious Paradip Refinery of IOCL was carried out for DHDT, SRU, & FGD Units, FCCU (INDMAX) & five numbers of storage tanks at Paradip Refinery. Subsequently, all these vital units were commissioned successfully in the month of November, 2015. With this, the IOCL’s state-of-the-art Paradip Refinery is ready to supply petroleum products in a phased manner.

This publication like all previous ones carries few case studies and articles on safety. There are two interesting case studies – one is Gas Broaching Incident at Shut-in well, and the other is Flash Fire at LPG Pump House of LPG Bottling Plant. Both the incidents were avoidable, provided the fundamentals were not flouted. Let us keep our focus on achieving not just zero accidents but zero incidents in all the Oil and Gas installations. Needless to mention that top management must take the lead, spread the message across, and motivate everyone in this direction.

DK Adhikari
Major OISD activities August-November, 2015

EXTERNAL SAFETY AUDITS (ESA)

➢ IOCL
  • Guwahati Refinery during October 7-10, 2015
  • LPG Bottling Plant Calicut, Kerala during August 20-22, 2015.
  • LPG Bottling Plant Chakan, Pune, Maharashtra during August 24-26, 2015.
  • LPG Bottling Plant Haridwar, Uttarakhand during September 3-5, 2015.
  • POL Depot Miraj, Maharashtra during September 4-5, 2015.
  • LPG Bottling Plant Salem, Tamil Nadu during October 08-10, 2015.
  • POL Terminal Vashi, Maharashtra during October 29-31, 2015.
  • LPG Bottling Plant at Bharatpur during November 16-18, 2015.
  • LPG Bottling Plant at Budge-Budge during November 4-6, 2015.
  • LPG Bottling Plant at Balasore, Odhisa during November 5-7, 2015.
  • Salaya-Viramgam-Koyali Crude Pipeline during September 8-11, 2015.

➢ HPCL
  • LPG Bottling Plant Madurai, Tamil Nadu during September 17-19, 2015.
  • LPG Bottling Plant Mangalore, Karnataka during October 15-17, 2015.

➢ BPCL
  • POL Terminal Sidhpur, Gujarat during August 10-12, 2015.
  • LPG Bottling Plant, Coimbatore, Tamil Nadu during August 24-26, 2015.
  • LPG Bottling Plant, Sholapur, Maharashtra during September 10-12, 2015.
  • Bina-Kota Product Pipeline (260 KM, 18” Dia) during September 28-30, 2015.

➢ ONGC
  • One Drilling Rig of OIL on August 16, 2015.
  • Two Offshore Drilling Rigs Sagar-Bhushan and Platinum Explorer from August 18-20, 2015.
  • Onshore Installation of Assam Asset was carried out during October 5-9, 2015.
  • Kalol-Nawagam-Koyali Crude Pipeline including Kalol CTF & Nawagam CTF during September 10-12, 2015.

➢ OIL
  • Barauni-Sonapur (303 KM) Crude Pipeline during October 8-10, 2015.

➢ GAIL
  • Vijaipur-Dadri Natural Gas Pipeline during October 29 to November 1, 2015.
  • Vaghodia, Gujarat during October 29-31, 2015.

➢ BGEPIIL
  • Two offshore installations (Panna Process Complex & Drilling Rig G.D.Chitra) during October 28-19, 2015.

➢ CAIRN INDIA LTD.
  • Well Head Platform GA, LA of CB-OS-02 Offshore Installation and Onshore Facilities on October 3, 2015.

PRE-COMMISSIONING AUDIT (PCS A)

➢ GAIL
  • Gas Processing Plant, Vaghodia, during Oct 29-31, 2015

➢ IOCL
  • DHDT, SRU, & FGD Units at IOCL : Paradip on August 10-11, 2015.
  • ISQSEV unit at IOCL Guwahati Refinery on September 3-4, 2015.
  • Delayed Coker unit at IOCL: Paradip Refinery on September 7-8, 2015.
  • Additional Storage Tank, POL Terminal at Loni, Maharashtra on August 14, 2015.
  • Additional Storage Tank, POL Depot at Shirud, Maharashtra on August 29, 2015.
  • Additional Storage Tank, POL Terminal at Bhatinda, Punjab on September 7, 2015.
  • Additional Storage Tank, POL Depot at Navalur, Karnataka on September 19, 2015.
  • Mounded Storage Facilities LPG BP, Borkhola, Assam during October 8-9, 2015.
  • Additional Storage Tank, POL Terminal at Allahabad, Uttar Pradesh on October 26, 2015.
  • Additional facilities at Paradip Terminal, Odhisa on November 13, 2015.
  • POL Terminal (Additional facilities) at Hazira during November 4-5, 2015.
  • FCCU (Indmax) & five numbers of storage tanks at Paradip Refinery during October 26-27, 2015.
  • Two numbers HSD Tanks of Digboi Refinery on October 11, 2015.

➢ BPCL
  • Additional Storage Tank, POL Depot at Navagam, Gujarat on August 13, 2015.
• New POL Terminal at Jobner, Rajasthan on August 22, 2015.
• Additional Storage Tank, POL Depot at Aonla, Uttar Pradesh on October 15, 2015.
• CDU-4 plant at Mumbai Refinery on September 11-12, 2015.
• ETP modification at Numaligarh Refinery on October 11, 2015.

➤ HPCL
• Additional Storage Tank, POL Depot at Mathura, Uttar Pradesh on October 03, 2015.
• New POL Terminal at Kanpur, Uttar Pradesh during October 30-31, 2015.
• TGTU of SRU Trian-1 and HIGEE unit of Vishakhapatnam Refinery during October 1-2, 2015.

➤ GAIL
• Gas Processing Unit & Gas Cracker units at GAIL Pata on September 14-15, 2015.

➤ CPCL, CHENNAI
• LPG/ Petrochemical Mounded Bullets during October 28-19, 2015.

CROSS COUNTRY PIPELINES
➤ IOCL
• Mohanpura Pipeline facility at Jaipur was carried out on August 10, 2015.
• Khana-Bolpur Loop Line (37 KM) & associated facilities at Bolpur was carried out on August 28, 2015.
• Chaksu-Manpuria (45.7 KM) Crude Loop line was carried out on September 26, 2015.

➤ HPCL
• Rewari-Kanpur Product Pipeline (443 KM) September 4-9, 2015.

➤ GAIL
• 10” Aptibudruk to MIDC, Tarapur Natural Gas Pipeline (32.5 KM) was carried out on November 9, 2015.

SURPRISE SAFETY AUDITS:
➤ IOCL:
• Haldia Refinery during August 20-21, 2015
• Aviation Fueling Station, Kolkata, West Bengal during September 25-26, 2015.

➤ CPCL
• Manali Refinery during September 14-15, 2015.
• CPCL, Chennai during September 21-22, 2015.

➤ HPCL
• Vishakapatnam Refinery during November 18-19, 2015.

➤ ONGC
• Drilling rig E-6100-III at Rajamundhary (A.P) on August 17, 2015.

➤ OIL
• Drilling Rig “Jhon#14”, Rajasthan was carried out on October 16, 2015.

CONSTRUCTION SAFETY AUDITS
• Construction Safety Audit of BPCL, Kochi Refinery during October 12-14, 2015.

AUDIT OF OIL SPILL RESPONSE (OSR) FACILITIES
(1) Special audit of Oil Spill Response and Fire Fighting capabilities of major Ports undertaken as per request of Ministry of Shipping as under:
• Mormugao Port, Goa
• New Mangalore Port
• Chennai Port
• Kamarajar Port Ltd., (Ennore)
• Haldia Port
• Kochi Port
• Tuticorin Port
• Mumbai Port
• JNPT, Navi Mumbai
• Vishakhapatnam Port
• Kandla Port
• Paradip Port

(2) Joint inspection of Tier-1 Oil Spill Response (OSR) capability of HPCL, Vishakhapatnam was carried out along with Indian Coast Guard (ICG) during November 6-7, 2015.

(3) Joint inspection of Tier-1 Oil Spill Response (OSR) capability of Niko Resources Ltd., Hazira was carried out on September 18, 2015 and Cairn India Ltd., Hazira on September 19, 2015.

CONSENTS ACCORDED TO OPERATE
➤ ONGC
• Offshore Jack up drilling rig “F G McClintock” was issued on November 13, 2015.
• Three unmanned Wellhead Platforms BB, VSEA and VW of BPA and three unmanned Platforms BE, BF & B-55 of BPB process complexes of B&S Asset was issued on October 20, 2015.
• Offshore Jack up drilling Rig “Noble Ed-Holt” was issued on October 9, 2015.

MEETINGS
• 93rd meeting of Technical committee of IR CLASS at IRS Mumbai was attended by Director (E & P) on Sept 09, 2015.
• OISD participated in the 94th meeting of Technical Committee on rule making of IR class at TRS, Mumbai on November 17, 2015.
• ED, OISD attended the Strategic Meet organized by MoPNG at Faridabad during August 21-22, 2015.
• ED, OISD attended the review meeting on September 10, 2015 for Upstream & Downstream Companies at Shastri Bhawan, chaired by Secretary, MoPNG.
• ED, OISD attended the review meeting on November 18, 2015 for Upstream & Downstream Companies at Shastri Bhawan, chaired by Secretary, MoPNG.
• Meeting was held at Shastri Bhawan on September 15, 2015 with Oil Industries on setting-up Emergency Response Centre (ERC) in India. The meeting was chaired by JS(R).
• Emergency Response Centre (ERC) meeting was held at OISD, office with Private and Joint Venture Oil Companies on October 12, 2015.
• Committee Meeting on setting up of Emergency Response Centre (ERC) was held at OISD, Noida office on November 19, 2015.
• OISD members of the “Technical Committee on Rule Making” of IR Class attended its 93rd meeting on September 15, 2015 at IRS (Indian Register of Shipping).
• “Monthly Review Meeting” on upstream and downstream companies was attended by ED, OISD on October 13, 2015 at Shastri Bhawan. The meeting was chaired by Secretary, PNG.
• Meeting with JS (R), PNG on Development of Safety Standard on various downstream activities of Petroleum business by OISD and PNGRB was held on October 16, 2015. ED, OISD attended the meeting.

FUNCTIONAL COMMITTEE MEETINGS
• 2nd Functional Committee Meeting of OISD-GDN-240 on Guidelines for Carrying out Quantitative Risk Assessment (QRA) of Oil & Gas Installations’ was held on August 12 – 13, 2015 at OISD Noida office.
• 4th Functional Committee Meeting of OISD- RP-174 revision was held on Aug 10, 2015.

OTHER MEETINGS
• High Pressure Water Mist Fire Fighting solutions for Offshore Platform, Rigs & closed segment of Oil & Gas Industry was presented by Kirloskar Brothers Ltd., and discussed the technology with OISD on September 9, 2015 at OISD office, Noida.
• A Study Tour was carried out during September 23-15, 2015 at Lisbon, Portugal for ascertaining the feasibility of pumping LPG in multi-product Pipeline of HPCL. The delegation was led by JS (R), along with members from OISD, PESO, EIL and HPCL.
• A meeting was held on Public Grievance on October 8, 2015 at Shastri Bhawan. The meeting was chaired by JS (Gen, RTI & PG). The meeting was attended by OISD representatives.
• Training was imparted to OISD Auditors/ Employees on “Conflict resolution-turning conflicts into opportunities” during October 13-14, 2015 at OISD.
• “Vigilance Awareness Week” pledge was taken by OISDiants on October 26, 2015.
• “Rashtriya Ekta Diwas” pledge was taken by OISDiants on October 30, 2015.
• Training on ISO-9001:2008 was imparted by ISO Consultant for the Internal Auditors of OISD on November 23, 2015.
• OISD expert took part in the meeting held at DGH, Noida office on November 27, 2015 to discuss the Recommendations of the Committee on Guidelines for Abandonment and Site Restoration.
• APSENSING, UK shared the technical information among the OISD experts on Fire Optic Type Two-wire based Rim Seal Fire Monitoring System of Floating Roof Tank on November 27, 2015 at OISD, Noida office.
• Meeting was held at OISD, Noida on November 19, 2015 to discuss and finalize GAIL’s comments on OISD-STD-111 Draft-IV.
• OISD officers interacted with API, ASTM & ASME representative on November 16, 2015 at New Delhi.
• Three OISD officers attended 22nd Lovraj Kumar Memorial Trust Annual Lecture on “The Future Oil” held at India International Lecture, New Delhi on November 18, 2015.

KNOWLEDGE SHARING BY OISD OFFICIALS
• OISD conducted a Joint Workshop with ONGC on “Well Control & Work over operations” on September 18-19, 2015 at Chennai. A paper on “An analysis of recent incident of uncontrolled flow of gas – OISD’s overview” was presented by Director (E & P) on September 19, 2015 at the same workshop.
• ED, OISD addressed the executives of industries in Pipeline Security Conference held on 20.08.2015.
• A presentation was made to Lok Sabha Standing Committee on September 29, 2015 at Parliament Annex on Safety, Security and Environment in the Petroleum Sector.
• OISD expert presented two technical papers in NACE Conference (CORCON 2015) held at Chennai on November 19-20, 2015.
CASE STUDY
ON FATAL INCIDENTS IN CROSS-COUNTRY OIL & GAS PIPELINES – A DIFFERENT PERSPECTIVE
By Shri Rajesh Uprety, Additional Director (Pipelines), OISD

About the Author
A mechanical engineer from G.B.Pant University of Agriculture & Technology with Post Graduate Diploma in Business Management from IMT, Ghaziabad having about 32 years’ experience in Oil & Gas industry. Special area of interests are Coating (CTE/3 LPE/FBE/Dual FBE) all types of pipes [API 5L/ASTM Grade/IS Grade], valves and pipe-fittings. Instrumental in introducing DFBE Coating in India in the year 2004. Presented six papers in NACE conference and one paper in ASME conference on various topics related to pipe and coating. In addition to this also presented other technical papers in various national & international seminars organized by IOCL, Petrofed etc.,

ABSTRACT:
In this paper the causes and consequences of accidents in hazardous oil and gas pipelines that result in the unplanned release of hazardous liquids/gases are examined. In the past few years the number of incidents have shown an increasing trend in the oil and gas industry.

When an oil and gas worker is injured, the severity and duration of injuries are far worse than in other industry sectors, and recovery times often take twice as long. Oil and gas accidents typically occur for the following reasons:

- Carelessness or recklessness
- Delays in equipment maintenance or repair
- Failure to give proper training
- Failure to properly communicate
- Safety procedures not in place
- Lack of proper Standard Operating Procedures
- Over dependence on external agencies

Given the amount of people employed by the gas and oil industry and the dangerous nature of oil and gas, it is almost inevitable that accidents will occur. Oil and gas accidents can involve explosions, fire, mishaps while raising pipeline, safety violations and other incidents, including:

- Improper construction and maintenance
- Pipeline transportation accidents
- Storage problems, including contamination
- During pigging operation
- Surge failure
- Corrosion failure

This paper is an attempt to highlight some untouched issues, which are responsible for such fatal incidents and various ways and means to avoid such incidents.

INTRODUCTION:
The materials that pipelines carry are flammable, explosive, or toxic, which means that pipelines pose a danger to people and property if these materials are released to the environment because of a pipeline failure. The development of residences, work places, and shopping areas near once isolated transmission pipelines, which carry gas and liquids at high pressures from producing areas to refineries or distribution networks, threatens to increase the risk of pipeline failure caused by the inadvertent excavation damage. Historically such excavations have been a major cause of transmission pipeline accidents. Accidents in the future could also be more severe because new development means more people and property would be affected in the event of a failure.

In Cross-Country Pipeline Sector during the period 2004-05 to 2014-15, the total number of incidents reported were 94, out of which 39 were fire incidents and there were a total of 51 fatalities.

Out of the total 94 nos. of incidents, 22 nos. of fatalities have taken place due to non-implementation of Management of Change procedure in a single incident in the year 2014-15. Therefore, it is very important that any change w.r.t. initial design conditions must be properly analyzed before changing the service fluid or any other design parameter. Year wise spread is shown in Figure P-1.

![Sum of Fatality](image)

FIG. P-1 : YEAR WISE NUMBER OF FIRE INCIDENTS

VARIOUS CAUSES OF ACCIDENTS:
One of the biggest problems contributing to leaks and ruptures is pretty simple: pipelines are getting older. About 35% of the nation's pipelines are more than 25 years old and some of the pipelines have even exceeded 50 years beyond
the design life.
The causes attributed to 94 nos. of incidents are as under:

1) Inadequate job knowledge - 1 no.
2) Management of change - 1 no.
3) Violation of work-permit system - 1 no.
4) Disregard to SOP - 6 nos.
5) Poor maintenance & inspection - 7 nos.
6) Non-compliance to PPE/ fall & slip - 11 nos.
7) Poor supervision - 11 nos.
8) Equipment failure - 27 nos.
9) Pilferage/ miscreant activity/ others (natural calamity) - 29 nos.

Even though there is only one incident due to management of change, however, the number of fatalities is highest. This clearly shows the significance of having a proper management of change procedure. It is essential that any change w.r.t. basic design conditions should be done after proper study/ analysis and through a proper management of change procedure.

**FIG. P-3 : PERCENT WISE CAUSES OF INCIDENTS**

A close analysis of Fig. P-3 above reveals that pilferage/ miscreant activities/ others (natural calamity) are high in cross-country pipeline and hence it calls for dedicated regular pipeline patrolling on the right of way. Line patrolling to be carried out in a more effective manner using modern gadgets such as GPS, GIS based Decision support system (DSS), state-of-the-art communication system etc. The second major contributor which has emerged in the last few years is the equipment failure. Number of instances of corrosion failure of pipes are increasing. One of the major reasons is that pipeline integrity management system is not being followed by all the industries as a result the health of the pipelines is not known. It may also be noted that presently about 35% of the total pipeline network have become old and exceeded the design life of 25 years. Therefore, all such old pipelines must require a residual life assessment in line with the Standard Operating Procedure for Integrity Assessment for Petroleum and Gas Pipeline.

**CONCLUSIONS:**

- For ensuring zero incidents following action is required to be taken:
  1) Process safety level awareness should be improved.
  2) Standard operating procedures shall be religiously followed.
  3) Root cause of any failure shall be properly analysed and its learning to be shared with the industry.
  4) Best inspection and maintenance practices to be adopted. Risk based inspection to be encouraged.
  5) Regular review of external safety audit recommendations of OISD to be done at the respective Board level.
  6) Complacency to be avoided.
  7) Even small issues to be given due importance.
  8) Proper time & energy to be devoted for carrying detailed design, engineering and finalizing engineering drawings.
  9) High dependency on third party agencies should be avoided.
  10) Surge analysis, hydraulic analysis, stress analysis etc., shall be carried out at the design stage and necessary mitigation measures shall be taken.
  11) Corrosion coupon/ corrosion probes shall be used for checking the rate of internal corrosion.
  12) Regular cleaning of the pipeline to be carried out with cleaning pigs.
  13) Intelligent Pigging Survey (IPS) shall be carried out regularly to assess the health of the pipeline. Recommendations of IPS to be mitigated in a fixed frame of time.
  14) Any design changes shall be routed through a proper management of change procedure.
  15) Health assessment of non-piggable pipelines to be carried out by using Direct Assessment techniques.
  16) Jetty lines need focused attention, it has been observed that due inspection and maintenance is not carried out for these lines.
  17) In case of high iron content, if the quantity of muck coming out is high, magnetic pig run is not advisable due to the fact that muck gets magnetized and it becomes solidified, which results in pig getting stuck up in the pipeline.
  18) When lots of debris are expected in a pipeline, **BY PASS PIGS** should be used. This reduces the chance of pig getting stuck.

One of the area's of concern, in the oil and gas industry is high percentage of fatality of contract workers in the installations. A study revealed that almost 90% fatalities are to the contract workers. This trend needs to be arrested forthwith. Industry must focus on improving the quality of training programmes being imparted to the contract workers. Therefore, attention must shift on the effectiveness of the programmes rather than the number covered.
An incident of gas broaching in the cellar pit and adjacent area took place in well which was shut-in and lying in a desert.

**Brief Description:**
The construction of the well was based on two CP policy. 13 3/8" casing is lowered up to 255 meters depth and cemented. After this, 8 1/2" hole was drilled up to the target depth 1055 meters. 7" 23 ppg casing was lowered up to 983 meters and cemented with cement top behind the casing at 793 meters.

Completion string consists of 2 7/8" tubing with retainer packer at 883.5 meters. The preformation interval is 915.50 - 920.50 meters. Before shut in, the well was producing gas @ 0.061 MMSCMD through 8 mm beam. The producing hydrocarbon gas contained about 12 % Carbon di-oxide gas by volume.

The gas leakage from the well was first noticed in the form of gas bubbles in the cellar pit and adjacent area which was filled with rain water due to rain.

The Shut in tubing pressure and 7" x 2 7/8" production casing pressure was recorded as 82 Kg/cm² and 76 Kg/cm² respectively indicating clear communication between tubing and production casing.

The STHP remained constant at 82 Kg/cm² upto 200 days then dropped to 67 Kg/cm². The production casing annulus (7" x 2 7/8") pressure dropped to 12 Kg/cm² on 4" day from the day it was first noticed, indicating development of communication between 7" casing and formation.

On 235th day, effort was being made to subdue the well by bulldozing kill fluid and surface pressure of 1300 – 1800 psi was applied. This resulted in further damage to the already damaged tubing, production casing and induced fracture to surface in the formation against the uncemented portion of 7" production casing

Gas broaching started from cellar pit and adjacent areas. The cellar pit and the side foundation sank due to uncontrolled gas broaching.

First attempt was made to kill the flowing well by pumping kill mud of 1.3 ppg through tubing. It did not work because the kill mud circulated from the upper communications between tubing, production casing and formation and required hydrostatic head could not be established to counter the formation pressure.

Coil Tubing Unit was arranged and 1.25" coil tubing was lowered up to top of the perforation. Made an attempt to kill the flowing well with circulation. This attempt also did not work due to the reason that the initial pumping pressure was very high due to frictional losses of 6000 meters of 1.25" diameter coil tubing. The required discharge could not be achieved to displace the gas from the well.

Arrangements were made to divert the well fluid, gas, at a safe distance from the well for safety of the operational personnel working at the well site and to reduce the gas broaching from area adjacent to the well. For this, pipe lines were fabricated and well was flowed with full opening from tubing and production casing (7" x 2 7/8") annulus.

A Coil tubing Unit was then arranged from Ahmedabad Asset, ONGC. The unit had reached the well site on 17th September, 2015 at 1500 hours. The length of coil tubing was reduced to 1400 meters by cutting approximately 1600 meters coil tubing from the spool in order to reduce the frictional losses and ultimately increase the discharge rate for well killing operation. All the equipment were function tested and pressure tested.

The 1.25" coil tubing was lowered to the bottom of the flowing well DND #9. Circulated with water followed by kill fluid of 1.15 specific gravity. The gas in the well was circulated out and stopped further entry of the gas influx into the well by establishing required hydrostatic head to counter the formation pressure. The well was killed with this procedure and gas broaching is successfully stopped.

**Root Cause Analysis:**
1. Well DND # 9 is an old well drilled in the year 1997. The
well was drilled with two CP casing policy. 7" diameter, N-80 grade and 23 ppf casing was lowered as production casing up to a depth of 983 meters and cemented with top of cement behind casing upto 793 meters. This means that 538 meters of production casing (TOC to 13 3/8" surface casing shoe) was directly exposed to formation.

2. The produced hydrocarbon gas from this well is having 12 % Carbon di oxide gas which is highly corrosive and prone to pitting. Continuous extraction of carbon di oxde gas has the potential to make the internal surface of pipes, casings to suffer from corrosion affects and reduce the thickness drastically resulting loss of mechanical integrity and material degradation. Mechanical properties like burst strength, collapse rating, tensile strength, ductility etc. is reduced and ultimately, pipes, casings fails.

3. There was communication between tubing string and the production casing which is evident from the annulus pressure readings with effect from 1st February, 2015 onwards. STHP (Shut in Tubing Head Pressure) = 82 KSC and SCP (Shut in Casing Pressure) = 76 KSC. This may be due to leakage through production packer or leakage in tubing string or both.

4. The SCP (Shut in Casing Pressure) dropped from 76 KSC to 12 KSC with effect from 7th March, 2015 confirming development of casing failure and communication between casing and formation. The communication may have developed below the shoe of previous surface casing and gas may have travelled to surface via channelling through upper unconsolidated loose formations.

5. During bulldozing with applying surface pressure of >1300 psi through tubing to subdue the well for work over operations, the gas leakage channels widened drastically and gas broaching started in cellar pit and adjacent areas.

Recommendations:

1. The casing policy i.e. surface casing landing depth, cement rise behind production casing should be reviewed. The landing depth of surface casing should be deepened or an intermediate casing should be introduced. The cement rise behind the production casing should be at least 50 meters inside the previous casing.

2. It should be ensured that the production casing material grade is compatible with carbon di oxide gas.

3. Wells having internal communications should not be subdued by bulldozing technique. These should be subdued by bottom killing.

4. During bulldozing through tubing to subdue the well, the outer annuluses should be monitored diligently. It should be ensured that the annulus pressure in any of the annulus should not exceed the MAOP for that particular annulus.

5. Annulus pressures in production casing annulus and other outer annulus should be monitored regularly. MAOP (Maximum Allowable Operating Pressure) should be calculated for each annulus of the wells. The annulus pressure, if any, in any of the annulus, must not exceed the MAOP value. If any of the annulus is having pressure, it should be diagnosed for assessing the cause and work over program should be formulated accordingly.

Participating in National Shooting Championship
Congratulations Varun!

Mr. Varun Prakash, Asstt. Director (Process) has participated in the 10 m (Air Pistol) event at the 59th NATIONAL SHOOTING CHAMPIONSHIP that took place during 1st - 15th December, 2015 held at Dr. Karni Singh Shooting Range, Tuglaqabad, Delhi.

Mr. Varun Prakash’s parent company is HPCL
CASE STUDY
A compilation of important observations on Earthing System in OMC Oil Installations

By Shri K.C. Nandi, Joint Director (POL)

About the Author

A mechanical engineering graduate from Jalpaiguri Govt. Engineering college, Shri K.C. Nandi joined HPCL in 1989. He is having more than two decades of rich experience of working in various POL marketing operations. Since May 2010, shri Nandi is working in deputation in OISD as joint Director (MO)

During OISD audits in last 5 years, certain observations have been noticed on construction and maintenance of earth pits across OMC Oil Installations which do not confirm to the requirement of IS Code -3043. Construction of earth pits are often found non-uniform across the OMC Oil Installations. This non-uniformity exists even among the earth pits constructed in the same installation.

These observations are:

1. Termination joint of the Earth pits are sometimes found at a depth beyond operator’s easy reach. Undoubtedly, this shall cause difficulty during testing/maintenance of the Earth pits.
2. Electrodes (pipe/strip) below the termination joint are often found exposed to the tune of 500 to 750mm.
3. Use of under sized pipe electrode than that of recommended in IS Code 3043- pipes may be of cast iron of not less than 100 mm diameter, 2.5 to 3 mtrs long and 13 mm thick, alternatively, mild steel water pipes of 38 to 50 mm diameter.
4. Use of under sized / non-standard nut/bolts than that of recommended in IS code 3043.
5. Use of Nut Bolts of materials which are prone to rusting.
6. The design of “C- clamp” often found not covering the entire circumference of the electrode.
7. Earth pits are often constructed side by side without allowing separation distance. A separation distance equal to driven depth of electrode is recommended.
8. Construction of multiple earth pits are often seen at one side of tank dyke/facility instead of distributing them around the dyke/facility to the maximum extent possible.
9. Funnel with mesh often found missing / not provided on top of Electrode for watering the Earth Pit on need.
10. Damaged civil work/hole allows snake /insects to enter inside the earth pit and may cause harm to the person while opening the cover.

11. Many a places, multiple earthing connections are terminated on a single hole /point on strip connected to an earth pit/grid.
12. Looping i.e. connecting earth conductor of one equipment to the earth point of multiple equipment and further terminating the same to a earth electrode or connected to a grid is done. Looping of earth conductor may lead to disaster if the final termination breaks then all the equipment in the loop shall be out of grounding.

Aberrations as mentioned above w.r.t IS Code 3043 are not warranted for and may affect effective dissipation of static charge or fault current besides maintenance & testing issue etc. Therefore, it is desirable to adhere strictly to the requirements of IS Code -3043 across all OMC Oil installations.

High resistance value of earth pits and its improper maintenance was also found to be an issue. In this connection, few important factors to remind in construction and maintenance of earth pits are:

1. Where, there is an option, a site, should be chosen in one of the following types of soil in order of preference – Wet marshy ground; clay, loamy soil, arable land, clayey soil, clayey soil or loam mixed with small quantities of sand; Clay and loam mixed with varying proportions of sand, gravel and stones; Damp & wet sand, peat. Dry sand, gravel chalk, limestone, granite and any very stony ground should be avoided.
2. Although electrode material does not affect initial earth resistance, care should be taken to select a material that is resistant to corrosion in the type of soil in which it will be used. Preferably, copper or galvanized mild steel should be used over cast iron as corrosion /metal loss in case of cast iron is high.
3. The high resistivity of earth is predominantly because of dryness of soil, however, moisture alone is not the predominant factor in the low resistivity of soils. Sufficient natural elements are also essential to form a
conducting electrolyte. Therefore, only abundance of water will not provide the soil with adequate conductivity.

4. The normal moisture content of soil ranges from 10% in dry season to 35% in wet season and approx. average may be perhaps 16-18% which is good enough for favourable earth resistance.

5. Thus, for construction of earth pit, a site should be chosen that is not naturally well drained. A water logged situation is not however, essential, unless the soil is sand or gravel, as in general no advantage results from an increase in moisture content above 15 to 20%. However, a site kept moist by water flowing over it should be avoided as the beneficial salts may be removed from the soil in such situation.

6. Installations having high soil resistivity should be artificially treated periodically to reduce the resistivity of the soil immediately surrounding the electrode. To reduce the soil resistivity, it is necessary to dissolve in the moisture, normally contained in the soil, some substance which is highly conductive in its water solution. The most commonly used substances are sodium chloride (NaCl), also known as common salt, calcium chloride (CaCl₂), sodium carbonate (Na₂CO₃), copper sulphate (CuSO₄), soft coke/charcoal, salt etc. The salt content about 5% in earth is good enough for favourable resistance.

7. The simplest application is by excavating a shallow basin around the top of the electrode, one meter in diameter and 300 mm deep. Apply artificial substances (mixture of coke/charcoal, salt) in the basin. The basin should subsequently be filled several times with water to soak into the ground which enhances the earth conductivity.

8. In using artificial treatment, the possible corrosive effect of the salt on electrode and connections should be considered. The use of coke breeze as an infill is not recommended as it may result in rapid corrosion of the electrode.

9. For protection of critical electrical equipment or operations where it requires rapid/effective dissipation of static charges, plate earthing over pipe earthing may be preferred.

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CONGRATULATIONS PAWAN - KEEP IT UP

Master Pawan Goyal, student of Class-X, son of Shri Mahesh Goyal, Joint Director-OISD has won GOLD MEDAL in 12th International Junior Science Olympiad (IJSO) held at South Korea from 2nd December 2015 to 11th December, 2015.

Pawan Goyal was one of five students who bagged gold medals at the 12th International Junior Science Olympiad that concluded on 11th December, 2015 in South Korea. With five gold medals and one silver, the Indian Team bagged the second position in the competition, after Taiwan, for the 'highest winning medals'. Around 43 countries participated in the event this year.

Pawan had been shortlisted after a rigorous screening process by Homi Bhabha Centre for Science Education, Mumbai. After three levels of tests conducted by the centre, six students were finalized to represent India at the international event. These students also underwent a 10 days training camp at Homi Bhabha Centre. South Korea hosted the IJSO this year.

The International Junior Science Olympiad is a competitive exam that is open to all students, primarily from secondary schools, from the participating countries. Over 45,000 students appeared for the first level of test from India.
Climate change is the most significant challenge to achieving sustainable development and it threatens to drag millions of people into poverty. At the same time, human beings don’t have better know-how and solutions available to avert the crisis and create opportunities for a better life for people all over the world.

The Intergovernmental Panel on Climate Change (IPCC) states that warming of the climate change system is unambiguous and is in large part due to increase in greenhouse gas (GHG) emission from human activities. Warming of the climate will probably lead to extreme weather events becoming more frequent and unpredictable. It makes clear that limiting climate change will require substantial and sustained reductions of GHG emissions.

Many factors, both natural and human, can cause changes in Earth’s heat balance, including:
- Changes in greenhouse effect, which affects the amount of heat retained by Earth’s surface
- Variations in the sun’s energy reaching Earth.
- Changes in the reflectivity of Earth atmosphere and surface.

These factors have caused Earth’s climate to change many times.

The most important GHGs directly emitted by humans include CO₂, CH₄, Nitrous Oxide and others. Today’s contribution to the greenhouse effect on Earth by the four major gases is:
- Water vapour, 36–70%
- Carbon dioxide, 9–26%
- Methane, 4–9%
- Ozone, 3–7%

The sources and recent trends of these gases are detailed below:

**Carbon Dioxide:**
Carbon dioxide is the primary greenhouse gas that is contributing to recent climate change. CO₂ is absorbed and emitted naturally as part of the carbon cycle, through animal and plant respiration, volcanic eruptions, and ocean-atmosphere exchange. Human activities, such as the burning of fossil fuels and changes in land use, power generation, transport etc causing CO₂ concentrations in the atmosphere to rise.

- The global annual mean concentration of CO₂ in the atmosphere has increased markedly since the Industrial Revolution, from 280 ppm to 400 ppm as of 2015.
- Some volcanic eruptions release large quantities of CO₂. However, the U.S. Geological Survey reports that human activities now emit more than 135 times as much CO₂ as volcanoes each year.
- Natural sources of CO₂ emissions are balanced to various degrees by natural CO₂ sinks. In 2010, 9.14 Giga tonnes of carbon (33.5 Giga tonnes of CO₂) were released from fossil fuels and cement production worldwide, compared to 6.15 Giga tonnes in 1990. In addition, land use change contributed 0.87 Giga tonnes in 2010, compared to 1.45 Giga tonnes in 1990. This build-up in the atmosphere is like a tub filling with water, where more water flows from the tub than the drain can take away.

**Methane:**
- Methane is produced through both natural and human activities. For example, natural wetlands, agricultural activities, and fossil fuel extraction and transport all emit CH₄.
- Methane emission will have 34 times the impact on temperature of a carbon dioxide emission of the same mass over the following 100 years. Methane has a large effect (100 times as strong as carbon dioxide) for a brief period (having a half-life of 7 years in the atmosphere, whereas carbon dioxide has a small effect for a long period (over 100 years).
- Due to human activities, CH₄ concentrations increased sharply during most of the 20th century and are now more than two-and-a-half time’s pre-industrial levels.
Nitrous Oxide:
Nitrous oxide is produced through natural and human activities, mainly through agricultural activities and natural biological processes.
- Fuel burning and some other processes also create N\textsubscript{2}O. Concentrations of N\textsubscript{2}O have risen approximately 18% since the start of the industrial revolution, with a relatively rapid increase towards the end of the 20\textsuperscript{th} century (Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007).

Other Greenhouse Gases:
- Water vapour is the most abundant greenhouse gas and also the most important in terms of its contribution to the natural greenhouse effect, despite having a short atmospheric lifetime. Some human activities can influence local water vapour levels. However, on a global scale, the concentration of water vapour is controlled by temperature, which influences overall rates of evaporation and precipitation. Therefore, the global concentration of water vapour is not substantially affected by direct human emissions.
- Ozone (O\textsubscript{3}), which also has a short atmospheric lifetime, is a potent greenhouse gas. Chemical reactions create ozone from emissions of nitrogen oxides and volatile organic compounds from automobiles, power plants, and other industrial and commercial sources in the presence of sunlight. In addition to trapping heat, ozone is a pollutant that can cause respiratory health problems and damage crops and ecosystems, besides its problem of causing ozone hole.
- Chlorofluorocarbons (CFCs), hydro chloro-fluorocarbons (HCFCs), per fluorocarbons (PFCs), and sulphur hexafluoride (SF\textsubscript{6}), together called F-gases, are often used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. Unlike water vapour and ozone, these F-gases have a long atmospheric lifetime, and some of these emissions will affect the climate for many decades or centuries.

In other words, imbalance in C, N & S cycles will lead to climate change. Pollution caused by the excessive use of fossil fuels may disturb this balance. Increase in the use of fossil fuels would result in the increase in the Green House Effect. This would have effect on the environmental balance. Warming of the atmosphere and ocean system is unequivocal. Many of the associated impacts such as sea level change (among other metrics) have occurred since 1950 at rates unprecedented in the historical record.
- There is a clear human influence on the climate.
- It is extremely likely that human influence has been the dominant cause of observed warming since 1950.

There is a thrust towards the adoption of cleaner & renewable energy sources (including biomass & hydrogen energy) to reduce the Green House Effect & reduce the carbon foot prints to ensure sustainable Development.

The importance of sustainability:
“Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their needs.”

Top 10 problems for next 50 years:
1. Energy
2. Water
3. Food
4. Environment
5. Poverty
6. Terrorism & War
7. Disease
8. Education
9. Democracy
10. Population

As per United Nations, in 2011, population was 7.3 billion and which is expected to increase to 9.5 billion in 2050 and 15 billion in 2100.

Over the second half of the 20\textsuperscript{th} century, while world population more than doubled, food production almost tripled, energy use more than quadrupled, and the overall level of economic activity quintupled creating a paradox for sustainability. To meet human needs, the world needs a growing economy and increased energy and material production, while coping with the threats to the planet. For some time, industrialized countries have evidenced dematerialization, a decrease in harmful consumption per unit of value of product; however, increases in the overall consumption of energy and most materials more than offset such gains. In industrializing countries and in urban areas in developing countries, energy and materials consumption is growing rapidly with little or no signs of slowing. For the poorest people and least developed countries, consumption is grossly inadequate with unmet needs for energy and materials for food production, housing, consumer goods, transportation, and health. But in both rich and poor countries alike, making and selling things to each other, including things we might not need, is the essence of current economic systems. Thus, the major challenge is how to shift to the less harmful but most needed energy and material production and consumption. Among these are the dual goals of sustainable development-the promotion of human development and well-being while protecting the earth’s life support systems. Nine of the essentials for human well-being and their current status, long-term trends, and impacts on the environment.
The modern concept of sustainable development is derived most strongly from the 1987 Report of World Commission on Environment and Development (WCED), the Brundtland Commission, it is rooted in earlier ideas about sustainable forest management and twentieth century environmental concerns.

Sustainable development is the organizing principle for sustaining finite resources necessary to provide for the needs of future generations of life on the planet. It is a process that envisions a desirable future state for human societies in which living conditions and resource-use continue to meet human needs without undermining the "integrity, stability and beauty" of natural biotic systems.

Sustainability can be defined as the practice of maintaining processes of productivity indefinitely - natural or human made - by replacing resources used with resources of equal or greater value without degrading or endangering natural biotic systems.

Sustainable development has been described in terms of three dimensions, domains or pillars. In the three-dimension model, these are seen as "economic, environmental and social" or "ecology, economy and equity."

The major non-gas contributor to the Earth's greenhouse effect, clouds, also absorb and emit infrared radiation and thus have an effect on radiative properties of the atmosphere.

ECOLOGY
1. Agriculture
2. Energy
3. Environment
4. Transportation

The ecological sustainability of human settlements is part of the relationship between humans and their natural, social and built environments. Also termed human ecology, this broadens the focus of sustainable development to include the domain of human health. Fundamental human needs such as the availability and quality of air, water, food and shelter are also the ecological foundations for sustainable development.

Agriculture:
Sustainable agriculture consists of environmentally-friendly methods of farming that allow the production of crops or livestock without damage to human or natural systems. It involves preventing adverse effects to soil, water, biodiversity, surrounding or downstream resources—as well as to those working or living on the farm or in neighbouring areas.

Energy:
Sustainable energy is the sustainable provision of energy that is clean and lasts for a long period of time. Unlike the fossil fuel that most of the countries are using, renewable energy only produces little or even no pollution. The most common types of renewable energy are solar and wind energy. Solar energy are commonly used on public parking meter, street lights and the roof of buildings. Wind energy has expanded quickly. The largest wind power station is in Texas and California. Household energy consumption can also be improved in a sustainable way, like using electronics with energy star logos which conserve water and energy. As renewable energy becomes more common, fossil fuel infrastructures is replaced by renewable, providing better social equity to these community.

Environment:
Environmental sustainability concerns the natural environment and how it endures and remains diverse and productive. Since natural resources are derived from the environment, the state of air, water, and the climate are of particular concern. The IPCC fifth assessment report outlines current knowledge about scientific, technical and socio-economic information concerning climate change, and lists options for adaptation and mitigation. Environmental sustainability requires society to design activities to meet human needs while preserving the life support systems of the planet. This, for example, entails using water sustainably, utilizing renewable energy, and sustainable material supplies (e.g. harvesting wood from forests at a rate that maintains the biomass and biodiversity)

An unsustainable situation occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished. Sustainability requires that human activity only uses nature’s resources at a rate at which they can be replenished naturally. Inherently the concept of sustainable development is intertwined with the concept of carrying capacity. Theoretically, the long-term result of environmental degradation is the inability to sustain human life. Such degradation on a global scale should imply an increase in human death rate until population falls to what the degraded environment can support. If the degradation continues beyond a certain tipping point or critical threshold it would lead to eventual extinction for humanity.
<table>
<thead>
<tr>
<th>Consumption of renewable resources</th>
<th>State of environment</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than nature's ability to replenish</td>
<td>Environmental degradation</td>
<td>Not sustainable</td>
</tr>
<tr>
<td>Equal to nature's ability to replenish</td>
<td>Environmental equilibrium</td>
<td>Steady state economy</td>
</tr>
<tr>
<td>Less than nature's ability to replenish</td>
<td>Environmental renewal</td>
<td>Environmentally sustainable</td>
</tr>
</tbody>
</table>

Transportation:
Transportation is a large contributor to greenhouse gas emissions. It is said that one-third of all gasses produced are due to transportation. Some western countries are making transportation more sustainable in both long-term and short-term implementations. An example is the modifications in available transportation in Germany. The city has implemented extensive methods of public transportation, cycling, and walking, along with large areas where cars are not allowed.

Since many western countries are highly automobile-orientated areas, the main transit that people use is personal vehicles. About 80% of their travel involves cars. Therefore, California, deep in the automobile-oriented west, is one of the highest greenhouse gases emitters in the world. The government has to come up with some plans to reduce the total number of vehicle trips in order to lower greenhouse gases emission. Such as:

- Improve public transit through the provision of larger coverage area in order to provide more mobility and accessibility, new technology to provide a more reliable and responsive public transportation network.
- Encourage walking and biking through the provision of wider pedestrian pathway, bike share station in commercial places, locate parking lot far from the shopping centre, limit on street parking, slower traffic lane in downtown area.
- Increase the cost of car ownership and gas taxes through increased parking fees and tolls, encouraging people to drive more fuel efficient vehicles. Government can use the extra revenue collected from taxes and tolls to improve the public transportation and benefit the poor community.

Other states and nations have built efforts to translate knowledge in behavioural into evidence-based sustainable transportation policies.

Economics:
It has been suggested that because of rural poverty and overexploitation, environmental resources should be treated as important economic assets, called natural capital. Economic development has traditionally required a growth in the gross domestic product. This model of unlimited personal and GDP growth may be over. Sustainable development may involve improvements in the quality of life for many but may necessitate a decrease in resource consumption. Ecological economics is defined by its focus on nature, justice, and time. Issues of intergenerational equity, irreversibility of environmental change, uncertainty of long-term outcomes, and sustainable development guide ecological economic analysis and valuation.

As early as the 1970s, the concept of sustainability was used to describe an economy in equilibrium with basic ecological support systems. Scientists in many fields have highlighted the limits to growth and economists have presented alternatives, for example a ‘steady state economy’; to address concerns over the impacts of expanding human development on the planet. In 1987 the economist Edward Barbier published the study, “The Concept of Sustainable Economic Development”, where he recognized that goals of environmental conservation and economic development are not conflicting and can be reinforcing each other.

A World Bank study from 1999 concluded that based on the theory of genuine savings, policymakers have many possible interventions to increase sustainability in macroeconomics or purely environmental. A study from 2001 noted that efficient policies for renewable energy and pollution are compatible with increasing human welfare, eventually reaching a golden-rule steady state. The study, interpreting sustainability in economic terms, found three pillars of sustainable development, interlinkage, intergenerational equity, and dynamic efficiency.

A study in 2002 looked at environmental and economic valuations and found a lack of “sustainability policies”. A study concluded in 2007 that knowledge, manufactured and human capital (health and education) has not compensated for the degradation of natural capital in many parts of the world. It has been suggested that intergenerational equity can be incorporated into a sustainable development and decision making, as has become common in economic valuations of climate economics. A review in 2009 identified
conditions for a strong case to act on climate change, and called for more work to fully account of the relevant economics and how it affects human welfare. According to John Baden “the improvement of environment quality depends on the market economy and the existence of legitimate and protected property rights.” They enable the effective practice of personal responsibility and the development of mechanisms to protect the environment. The State can in this context “create conditions which encourage the people to save the environment.”

**Politics:**
The International Institute for Sustainable Development has similarly developed a political policy framework, linked to a sustainability index for establishing measurable entities and metrics. The framework consists of six core areas, international trade and investment, economic policy, climate change and energy, measurement and assessment, natural resource management, and the role of communication technologies in sustainable development.
The United Nations Global Compact Cities Programme has defined sustainable development as a way that broadens the usual definition beyond states and governance. The political is defined as the domain of practices and meanings associated with basic issues of social power as they pertain to the organisation, authorisation, legitimation and regulation of a social life held in common. This definition is in accord with the view that political change is important for responding to economic, ecological and cultural challenges. It also means that the politics of economic change can be addressed.
They have listed seven sub domains of the domain of politics:
1. Organization and governance
2. Law and justice
3. Communication and critique
4. Representation and negotiation
5. Security and accord
6. Dialogue and reconciliation
7. Ethics and accountability

**Culture:**
Working with a different emphasis, some researchers and institutions have pointed out that a fourth dimension should be added to the dimensions of sustainable development, since the triple-bottom-line dimensions of economic, environmental and social do not seem to be enough to reflect the complexity of contemporary society. In this context, the policy statement “Culture: Fourth Pillar of Sustainable Development”, passed on 17th November, 2010, in the framework of the World Summit of Local and Regional Leaders - 3rd World Congress of United Cities and Local Governments (UCLG), held in Mexico City. The other school of thoughts that economics is primary, and culture and politics should be included in ‘the social’. These points to the relation between culture and sustainable development through a dual approach: developing a solid cultural policy and advocating a cultural dimension in all public policies. The circles of sustainability approach distinguishes the four domans of economic, ecological, political and cultural sustainability.

**Conclusion:**
Sustainable development is a vision and a way of thinking and acting so that we can secure the resources and environment for our future generation. It will not be brought about by policies only-it must be taken up by society at large as a principle guiding the many choices each citizen makes every day, as well as the big political and economic decisions that affect many. It is clear that environmental degradation tends to impose the largest costs on those generations that are yet to born. Future generations are disadvantaged with regards to present generations because they can inherit an impoverished quality of life, share a condition of structural weakness in having no voice and representation among the present generation and so their interests are often neglected in present decisions and planning while it is very much needful that we think about our generation. We can only improve sustainable development when it will put an emphasis on involving citizens and stake holders. Ultimately, the vision will become reality only if everybody contributes to a world where economic freedom, social justice and environment protection go hand in hand, making our own and future generation better off than now.

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**CONGRATULATIONS Nitya & Neelabh - KEEP IT UP**

Mrs Nitya Sharma Pathak, daughter of Shri S K Sharma, Addl. Director OISD, has been top ranking Scholar in B.Tech & M.Tech. in the field of Agricultural Engg. & is presently pursuing her Ph.D at Banaras Hindu University (BHU), Varanasi. She has been selected among the 14 selected students from India, as a fully funded Visiting Researcher in the University of Reading, Berkshire, United Kingdom, by the Commonwealth Scholarships Commission & joined there on 27th September, 2015.

Master Neelabh Krishn Sharma, son of Shri S.K. Sharma, Addl. Director OISD, who has done B.Tech in Electrical & Electronics, was selected in Hewlett Packard Enterprises as Storage Consultant, Mission Critical, managing Globally, joining at Bangalore on 7th Oct., 2015. He is among 7 persons from all over the India selected for this role.
The Incident:

Fire fighting water sprinkler system of the LPG plant was being tested by an external audit team. Team tested the water sprinkler system of mounded storage vessels (MSVs) and sprinkler system of LPG pump house also got actuated which was connectect with the Deluge Valve of the MSVs. After sprinkler testing when plant power was restored, an incident of short circuiting of underground electrical power cable of LPG pump has occurred, which resulted flash fire. Distance of flash fire was within 1.0 from the LPG pump. Flash Fire was extinguished by the plant staff effectively.

Sequence of Events:

- MVSS of mounded storage vessels (MSVs) was tested by the ESA team at around 1700 hrs
- MVSS of LPG pump house also actuated since it was connected with the same Deluge Valve of MSVs.
- All safety system actuated, electrical power to equipment’s tripped and plant operation stopped as per system design.
- After testing of MVSS, Fire pumps were stopped and deluge was reset and clearance was given to the plant manager to restart the plant.
- Electrical power to equipment was restored and around 1745 hrs when LPG pump was started by the pump house operator, flash fire due to short circuiting of underground electrical power cable of the LPG pump was observed within 1.0 m distance from the LPG pump.

- Flash fire was immediately extinguished by the plant staff using DCP fire extinguisher.
- Plant could not confirm by whom and when this electrical power cable jointing work was done.

Root Cause:

1. Short circuit of non-standard electrical joint caused flash fire due to sprinkler water entry in cable joint.
2. Plant has done jointing of two different size cables using non-standard joint kit.
3. Standard procedure for jointing of electrical cables was not followed.
4. Lack of supervision during cable jointing work.
5. Proper cable trench was not available for the electrical cables in the LPG pump house.
6. Cable jointing work was not carried out by the qualified electrical contractor.

Learnings:

1. Standard engineering practices shall be followed for such critical jobs.
2. Only standard cable joint should be used for jointing of electoral cable.
3. Qualified contractor should be deployed for such electoral jobs.
4. Effective supervision shall be ensured for such critical jobs.
5. Electrical power cables shall be laid through proper cable trench or cable trays.

Power cable Joint Kit and procedure for cable jointing
CONFLICT MANAGEMENT TRAINING ORGANIZED FOR THE FIRST TIME AT OISD

A special initiative was taken for conducting an In-house Training Programme on “Conflict Management” for OISDians on 13-14th October, 2015 at OISD, Noida. This program was attended by officers of OISD.

The program was conducted by a team of professional experts in the field of soft skill training from ‘Learning@Work’, Delhi and was inaugurated by Shri Tarsen Singh, Director (E&P), OISD.

The program was tailor-made, keeping the specific need of our expert and experienced team of Auditors to empower them for handling disagreements and conflicts at the time of recording the observations and technical deficiencies at the auditee locations.

This two days’ Workshop was also aimed at enhancing the soft skills of the participants which in today’s context is becoming increasingly important to maintain the work & life balance.

The module had a special design to make the participants realize the importance of harnessing their hidden potential and improve their core competencies in the field of technical audits with a view to enjoy their work both at office as well as the auditees’ premises.

The spectrum of training also covered critical areas of linkages between human behavior and application of technology while conducting audits keeping in mind the auditees’ perspective. The programme had a multi-pronged approach to help the talented work force to become smart auditors.

At the end of two days, the participants were encouraged to draw the specific individual action plan for effective implementation of the takeaway of the programme in the field. The programme was concluded with the meaningful review by Shri D.K. Adhikari, Executive Director, OISD who also appreciated the training programme and took cognizance of the participants’ feedback for future programmes.

The OISDians fully participated and enjoyed the programme, that was conducted for the first time in OISD.
CASE STUDY

Refinery Construction Site Safety

By Shri A.K. Arora, Additional Director (Gas Processing & MIS)

About the Author

Shri A.K. Arora passed out from BHU in Mechanical Engineering. Joined Indian Oil Corporation, Refinery Division and worked for about 36 years in different areas in “Project execution and maintenance”. He is with OISD for the last 4 years.

BACKGROUND

Construction industry is the second largest industry in India after agriculture. However construction workmen at any site keep on changing because of different skills requirements at different stages of projects. Moreover construction workmen are mostly illiterate & unorganized. As such construction activities pose much more safety hazards.

Refinery projects construction poses many safety challenges, since different type of works like excavation, concreting, steel works, equipment erections, pipeline works, electrical & instrumentation works need to be done by multiple agencies in small plot area. Many times most of these activities are performed concurrently by workmen of different agencies.

Any accident or fatality at construction site causes huge loss to the organization in terms of revenue loss, loss of production, loss of image etc. apart from legal & social hassles. Thus effective construction safety management is of paramount importance.

Height work safety management is of utmost importance at refinery construction sites because most of the fatalities occur either because of fall from height or hit by objects fallen from height.

CASE STUDY

A fatal incident occurred during erection of a pre-fabricated pipe spool of 6” dia & about 10 Mtrs. length. The pipe spool was being erected from ground to a height of about 20 mtr. and was to be routed in between the two process columns. The spool was lifted with the help of 50 MT capacity crane and was being maneuvered by riggers with help of ropes from the platforms, at about 20 mtrs heights, of two process columns. The platform of one of the columns was not complete. This platform did not have vertical protections like hand railing, leg guard, toe guard etc. Also some of the floor grating segments were not welded & were loosely placed. As such this platform was not complete and should not have been opened for approach there.

The workman lost his balance while manoeuvering the spool with the help of rope, and fell down at the floor scattered with steel pipes & structural members, since his fall protection safety harness was not anchored.

“Height work safety management” requirements were not followed. The worker could approach a platform location at about 20 mtrs height, which was incomplete and hence was unsafe for working. Also he did not anchor his safety harness with any firm object on the platform. All these reflect at inadequate supervision at site and disregard to safety procedures.

RECOMMENDATIONS:

(i) System of job specific “Permit to work at height” should be followed. Permit should be signed by issuer only after “site visit” and ensuring that requisite safety measures are in place, as per the job safety analysis.

(ii) Only experienced riggers & supervisors should be engaged for executing the equipment & piping erection works. They should be adequately trained on use of safety equipment like anchoring of safety harness before starting the job.

(iii) All free fall openings/ locations at height , should be blocked by physical means, so that no one approaches these locations.

(iv) Construction sites should be subjected to third party “construction safety audits” on regular basis. Recommendation should be documented & tracked by management till closure.

(v) Good housekeeping should be maintained at construction site. Proper system for pipe spools & prefabricated structural management should be implemented.

CONCLUSION:

“Height Work Safety” management should be strictly followed at refinery construction sites as per the safety plan. All height work locations should be provided with good scaffolding to approach, firm platforms to work at, having no free fall opening. Height jobs should be assigned to experienced & healthy workmen only.
भारत के संविधान निर्माताओं ने 14 सितंबर 1949 को हिंदी को भारत की राजनीति के लिए स्थायी किया गया था। भीमेश बहु भारतवर्धन वें हिंदी संस्कृति के कस्तूर में नामक जानी जाता है। तेलंगाना संस्कृति विश्वास में हर वर्ष की माति इस बार भी दिनांक 14 से 21 सितंबर, 2015 तक हिंदी संविधान नगर। इस समारोह के दौरान उससे सबसे अधिक आदर्श एवं कर्मचारियों के लिए निरन्तरता करार्यम आयोजित किए गए।

1. हिंदी संविधान शुभारंभ तथा हिंदी प्रसारण

2. हिंदी कर्मचारी एवं हिंदी मुहावरा प्रतियोगिता - 16 सितंबर, 2015

3. हिंदी अनुवाद प्रतियोगिता - 18 सितंबर, 2015

4. विवाह गोष्टि, हिंदी संवाहन समापन एवं पुरस्कार वितरण - 21 सितंबर, 2015

हिंदी संविधान शुभारंभ तथा हिंदी प्रसारण

तेलंगाना संस्कृति निर्माताओं में हिंदी संविधान शुभारंभ दिनांक 14 सितंबर, 2015 को किया गया। सांस्कृतिक क्रिया के उपरांत, हिंदी द्वारा निर्मित विश्वास तथा स्थायी निर्माण (प्रायौं) द्वारा संस्कृति विश्वास के लिए मार्गदर्शन। इसके उपरांत श्रीमान नाथनाथ गोवर्धन ने विश्वास के लिए मार्गदर्शन का क्रियान्वयन किया।

3. हिंदी अनुवाद प्रतियोगिता

3. हिंदी अनुवाद प्रतियोगिता दिनांक 18 सितंबर, 2015 को आयोजित की गई। इस प्रतियोगिता के प्रमुख हिंदी-अंग्रेजी शब्द, शब्द व्यवस्था, कार्यालय लिखित प्रकार की हिंदी संविधान की आयोजन किए गए।

4. हिंदी संवाहन समापन एवं पुरस्कार वितरण

हिंदी संवाहन समापन के बाद एक विवाह गोष्टि का आयोजन किया गया था। इस प्रकार हिंदी संवाहन के लिए आयोजित किए गए।
Swacch Bharat Activities by OISD

Compiled By- Mahesh Goyal, Joint Director (MO)

Hon'ble Prime Minister of India had launched Swacch Bharat Abhiyan on 2nd Oct., 2014. Since then OISD is continuously putting efforts for success of Swacch Bharat Abhiyan. As one of the major initiatives, it was decided that whenever External Safety Audit (ESA) of any LPG plant shall be conducted, Audit Team should also monitor the cleanliness of public places of the visited LPG Plant like Toilets for PCVO Drivers, workmen & security guards, Drinking water facility, canteen etc. To sensitize top executives of the OMCs for this initiative, same is being mentioned in the Audit intimation letter being sent the CEO of the respective OMCs.

During Aug., 15 to Nov., 15, External Safety Audit of 11 LPG plants of various OMCs have been conducted and Swacch Bharat Abhiyan activities were checked at these LPG plants during ESA. Audit Team takes the photograph of public places of the plant on 1st day of audit and thereafter plant personnel ensure cleaning of these places and handover photographs of these clean places on last day of audit to Audit Team during final closing meeting for the ESAs, with a commitment to maintain cleanliness on sustained basis.

Results of this initiative are very encouraging.
Swacch Bharat Activities by OISD

Before

Plant Canteen

After

Contractors’ employees toilet

Staff toilet
NEWS IN BRIEF

OISD BIDS FOND ADIEU TO OUR BELOVED
SHRI HIRAK DUTTA & SHRI M.N. SRIVASTAVA

Shri Hirak Dutta, Executive Director, OISD superannuated on 31st August, 2015. He was given a very warm and emotional farewell by the entire OISD family. Speaking on this occasion, Shri D.K. Adhikari wished him good luck for the second innings. During the last four years, OISD has accomplished many important milestones under the able leadership and guidance of Shri Hirak Dutta. Everyone acknowledged his versatile personality, soft spokeness, excellent oratorship and dynamic leadership qualities. His passion towards work and a concern for all was appreciated by everyone.

In his farewell speech, Shri Hirak Dutta expressed his thanks and gratitude to the entire OISD team and told that success of any organization does not depend on any individual, rather it is achieved by co-operation, dedication and hard work of the entire team. He also spoke about the future challenges in front of OISD.

The program was concluded by conveying good wishes.
Shri M.N. Srivastava, Additonal Director, Marketing (POL), OISD superannuated on 31st August, 2015. He was given a very warm and emotional farewell by the entire OISD family. Speaking on this occasion, Shri D.K. Adhikari wished him good luck for his second innings and appreciated his contribution in OISD in the last two years.

Shri D.K. Adhikari, Director (MO) presenting a flower bouquet to Shri Hirak Dutta, Executive Director

Shri Hirak Dutta served the Oil & Gas Industry for last 35 years and during his long tenure has served the industry in different fields. He started his long and memorable career in 1979 in IOCL. He worked in different departments such as Projects, Operation, Technical Services and Human Resources.
Shri Hirak Dutta joined OISD in the year 2011. He has got rich experience in operation and maintenance in oil and gas industry. He has presented various technical papers at both national and international level. He has also published number of technical papers in various national and international journals. His retirement will certainly create a huge vacuum in the industry, which will be very difficult to fill.

His dedication and disciplined approach towards the work and his soft spokeness was appreciated by one and all.

Shri M.N. Srivastava served the Oil & Gas Industry for 34 years and during his long tenure has served the industry in different fields. He started his career from Barauni Refinery of IOCL in the year 1980 and thereafter, worked in different departments such as Corporate Planning, Projects, Maintenance, Technical Services etc.

Shri Tarsem Singh, Director (E&P) presenting a flower bouquet to Shri M.N. Srivastava, Additional Director, Marketing